

CLAIMS:

1. A playback apparatus for use in a reproducing system which includes a plurality of play modes, comprising:

a memory (335) configured to store data to be read from a data source (1), said

5 data configured as a plurality of data blocks on said data source (1);

a presentation unit (340) configured to retrieve one or more data blocks from the memory (335) for presentation to a user;

a controller (365) configured to manage the contents of the memory (335) and control the operations of said data source (1), said controller comprising:

10 a ranking unit (360) operable to rank the desirability of at least two data blocks from among said plurality of data blocks wherein said desirability ranking is based on criteria comprising: (i) each of said at least two data blocks predicted future use in at least two of said plurality of play modes and (ii) the relative ranking of said at least two of said plurality of play modes.

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2. The playback apparatus of Claim 1, wherein said desirability ranking criteria of each of said at least two data blocks predicted future use in at least two of said plurality of play modes further comprises determining a time of said predicted future use.

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3. The playback apparatus of Claim 1, wherein said relative ranking of said at least two of said plurality of play modes is based on the probability of the playback apparatus remaining in or switching to said at least two of said plurality of play modes at a future time.

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4. The playback apparatus of Claim 1, wherein said relative ranking of said at least two of said plurality of play modes is based on a user's past usage patterns of said at least two of said plurality of play modes.

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5. The playback apparatus of Claim 1, wherein said relative ranking of said at least two of said plurality of play modes is based on a current play mode and whether a recent play mode change has occurred.

6. The playback apparatus of Claim 1, wherein said relative ranking of said at least two of said plurality of play modes is based on a user's play mode preferences.

5 7. The playback apparatus of Claim 1, further comprising a disc control unit (345) in communication with said ranking unit (360), said disc control unit (345) configured to use at least said desirability ranking to determine which of said plurality of data blocks to retrieve from said data source (1).

10 8. The playback apparatus of Claim 1, wherein said controller (365) further comprises a memory management unit (350) in communication with said ranking unit (360), said memory management unit (350) configured to delete data blocks from said memory (335).

15 9. The playback apparatus of Claim 8, wherein those data blocks having the lowest relative ranking in said memory (335) are selected for deletion by said memory management unit (350).

20 10. The playback apparatus of Claim 9, further comprising a disc control unit (345) in communication with said ranking unit (360), said disc control unit (345) configured to use at least said desirability ranking to determine which of said plurality of data blocks to retrieve from said data source (1).

25 11. The playback apparatus of Claim 10, wherein said memory management unit (350) and said disc control unit (345) utilize the same fragment ranking criteria.

30 12. The playback apparatus of Claim 1, further comprising a candidate identifier unit (355) configured to select a set of candidate blocks from said plurality of data blocks on said data source (1) for consideration by said ranking unit (360) and said disc control unit (345).

13. The playback apparatus of Claim 12, wherein said set of candidate blocks is selected by said candidate identifier unit (355) by extrapolating, for said at least two play modes, the data blocks to be read by said presentation unit (340) during operation in each of said at least two play modes.

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14. The playback apparatus of Claim 13, wherein said extrapolation begins substantially near a block that is currently being presented by said presentation unit (340).

15. A playback apparatus for use in a reproducing system which includes a plurality of play modes, comprising:

10 a memory (335) configured to store data to be read from a data source (1), said data configured as a plurality of data blocks on said data source (1);

a presentation unit (340) configured to retrieve one or more data blocks from the memory (335) for presentation to a user;

15 a controller (365) configured to manage the contents of the memory (335) and control the operations of said data source (1), said controller comprising:

a ranking unit (360) operable to rank the desirability of at least two data blocks from among said plurality of data blocks wherein said desirability ranking is determined from: (i) extrapolating data block usage in said at least two of said plurality of play modes and (ii) interleaving the extrapolations.

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16. The playback apparatus of Claim 15, wherein said interleaving the extrapolations is based on the probability of the playback apparatus remaining in or switching to said at least two of said plurality of play modes at a future time.

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17. The playback apparatus of Claim 15, wherein said act of interleaving the extrapolations is based on a user's past usage patterns of said at least two of said plurality of play modes.

18. The playback apparatus of Claim 15, wherein said act of interleaving the extrapolations is based on a current play mode and whether a recent play mode change has occurred.

5 19. The playback apparatus of Claim 15, wherein said act of interleaving the extrapolations is based on a user's play mode preferences.

20. The playback apparatus of Claim 15, further comprising a disc control unit (345) in communication with said ranking unit (360), said disc control unit (345)
10 configured to use at least said desirability ranking to determine which of said plurality of data blocks to retrieve from said data source (1).

21. The playback apparatus of Claim 15, wherein said controller (365) further comprises a memory management unit (350) in communication with said ranking unit (360), said memory management unit (350) configured to delete data blocks from said
15 memory (335).

22. The playback apparatus of Claim 15, wherein those data blocks having the lowest relative ranking in said memory (335) are selected for deletion by said memory
20 management unit (350).

23. The playback apparatus of Claim 15, further comprising a disc control unit (345) in communication with said ranking unit (360), said disc control unit (345)
configured to use at least said desirability ranking to determine which of said plurality of
25 data blocks to retrieve from said data source (1).

24. The playback apparatus of Claim 15, wherein said memory management unit (350) and said disc control unit (345) utilize the same fragment ranking criteria.

30 25. The playback apparatus of Claim 15, further comprising a candidate identifier unit (355) configured to select a set of candidate blocks from said plurality of

data blocks on said data source (1) for consideration by said ranking unit (360) and said disc control unit (345).

26. The playback apparatus of Claim 25, wherein said set of candidate blocks
5 is selected by said candidate identifier unit (355) by extrapolating, for said at least two play modes, the data blocks to be read by said presentation unit (340) during operation in each of said at least two play modes.

27. The playback apparatus of Claim 26, wherein said extrapolation begins
10 substantially near a block that is currently being presented by said presentation unit (340).

28. A method of ranking the desirability of at least two data blocks from among a plurality of data blocks of a data source, for use in a playback apparatus having a plurality of play modes, the method comprising the acts of:

15 (i) determining each of said at least two data blocks predicted future use in at least two of said plurality of play modes; and

(ii) determining the relative ranking of said at least two of said plurality of play modes.

20 29. The method of Claim 28, wherein said act of determining each of said at least two data blocks predicted future use in at least two of said plurality of play modes further comprises the act of determining a time of said predicted future use of said each of said at least two data blocks.

25 30. The method of Claim 28, wherein said act of determining the relative ranking of said at least two of said plurality of play modes further comprises computing the probability of the playback apparatus remaining in or switching to said at least two of said plurality of play modes at a future time.

31. The method of Claim 28, wherein said act of determining the relative ranking of said at least two of said plurality of play modes further comprises determining a user's past usage patterns of said at least two of said plurality of play modes.

5 32. The method of Claim 28, wherein said act of determining the relative ranking of said at least two of said plurality of play modes further comprises determining a current play mode and whether a recent play mode change has occurred.

10 33. A method of ranking the desirability of at least two data blocks from among a plurality of data blocks of a data source, for use in a playback apparatus having a plurality of play modes, the method comprising the acts of:

- (i) extrapolating data block usage in said at least two of said plurality of play modes; and
- (ii) interleaving the extrapolations.

15 34. The method of Claim 33, wherein said act of interleaving the extrapolations further comprises the act of determining a time of said predicted future use of said each of said at least two data blocks.

20 35. The method of Claim 33, wherein said act of interleaving the extrapolations further comprises computing the probability of the playback apparatus remaining in or switching to said at least two of said plurality of play modes at a future time.

25 36. The method of Claim 33, wherein said act of interleaving the extrapolations further comprises determining a user's past usage patterns of said at least two of said plurality of play modes.

30 37. The method of Claim 33, wherein said act of interleaving the extrapolations further comprises determining a current play mode and whether a recent play mode change has occurred.

38. The method of Claim 33, wherein said act of interleaving the extrapolations further comprises determining a user's play mode preferences.